

The Right How, Cow, Plants, and Biology Heal the Land

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STORY AT-A-GLANCE

- › Healthy soil acts like a sponge, absorbing nearly all rainfall, while conventionally tilled soil sheds water and erodes, contributing to droughts and floods
- › Livestock, when managed properly through rotational grazing, restore degraded land by fertilizing, reseeding, and rebuilding soil structure naturally
- › Farmers around the world are trapped in a broken agricultural system that destroys biodiversity, bankrupts producers, and relies heavily on synthetic inputs
- › Bare soil increases atmospheric carbon dioxide (CO₂) and disrupts rainfall patterns, while covered, biologically active soil cools the surface and restores the local water cycle
- › You can support land restoration by buying from regenerative farmers, choosing pasture-raised food, avoiding ultraprocessed products, and raising awareness in your community

Modern agriculture is collapsing under its own weight — and the soil is paying the price. Across the U.S., topsoil is washing away, microbial life is disappearing, and farmers are going broke trying to prop up a system that wasn't built to last. What used to be self-sustaining, living ecosystems are now bare, lifeless fields that repel rain instead of absorbing it.

When soil biology dies, water runs off instead of soaking in, floods increase, and crops fail. The root problem is that soil no longer captures sunlight or holds water the way nature intended. Former U.S. Department of Agriculture soil scientist Ray Archuleta has

spent decades working with farmers across six continents, and he says the pattern is always the same. Overgrazing, chemical fertilizers, and relentless tillage strip the land of its living cover, leaving it naked, hungry, thirsty, and “running a fever.”¹

That’s not a metaphor — it’s a measurable collapse of the four core ecosystem processes: sunlight capture, water cycling, nutrient flow, and biodiversity. You’re not just looking at soil degradation; you’re looking at the unraveling of everything that makes food, and life, possible. What many people don’t realize is that these degraded lands aren’t beyond repair.

In fact, the biology-based solution is already here, and it starts with livestock. Cows, when moved in the right way, jump-start dormant ecosystems by fertilizing, stirring, and reseeded the land — much like wild bison once did. Rotational grazing paired with plant diversity doesn’t just rebuild topsoil — it restores rainfall patterns and brings dead ground back to life.

That’s why Archuleta’s work is so compelling: it proves that healing land isn’t about adding more chemicals or inventing new technology. It’s about stepping back and learning how to mimic the architecture of nature itself. Let’s dig into what happens when you do.

Healing the Land Starts with Changing How You See It

In a compelling lecture at the 2024 R-SOIL Conference, soil scientist Archuleta broke down the destructive myths behind conventional farming and laid out a new model based on nature’s original blueprint.² His focus? Teaching producers to stop treating soil like dirt and start seeing it as a living, breathing ecosystem.

The presentation, featured on Matt Powers’ social media channel, walks viewers through a decades-long journey of failure, insight, and practical strategies for land restoration — no chemistry required.

- **Farmers around the world are dealing with the same problems — and the same wrong mindset** — After traveling across six continents, Archuleta observed that most producers, regardless of geography, suffer from the same core issue: a mindset shaped by reductionist science and **industrial agriculture**

This narrow way of thinking sees problems and solutions in fragments rather than interconnected systems. Whether in Idaho or India, he found that focusing only on fertilizers, equipment, or outputs misses the larger design — nature's design — and that design always starts with life in the soil.

- **Real recovery begins when you mimic nature instead of fighting it** — Rather than relying on synthetic inputs or new technologies, Archuleta stresses the importance of mimicking nature's architecture: diverse plant cover, tightly managed grazing, minimal soil disturbance, and continuous sunlight capture. This method is visible in ranches he's worked with in New Mexico, where desert land has been transformed into thriving green pastures using nothing more than animals, fencing, and timing.
- **Mindset is the first thing that needs to change** — Archuleta says the greatest barrier to regeneration isn't technical — it's mental. Farmers conditioned by university training or generational habits resist holistic thinking. He compares this social conditioning to an infamous monkey experiment: once a behavior is learned, it becomes self-reinforcing, even if it no longer makes sense.

Many farmers have been conditioned to beat down anything that challenges the norm, including biological methods that clearly outperform conventional ones.

- **The industrial model is bankrupting rural communities** — Archuleta presents data showing that most of the wealth generated from agriculture doesn't stay with the farmer. Charts of U.S. and Canadian farm income show a dramatic decline over time, with most profits now going to agribusiness. The current system leaves many **farmers** unable to pass their land to their children — not because they lack knowledge, but because they're trapped in a broken economic and ecological loop.

- **Conventional soil looks dead for a reason — it is —** Archuleta used simple but powerful demonstrations to drive home his message. In one rainfall simulator test, bare tilled soil shed nearly all the water as runoff, carrying precious topsoil with it. But next to it, a biologically active, covered soil sample absorbed every drop, proving the power of aggregation and living systems.

Another striking test compared soil from a conventional field with soil from a farm using **cover crops and no tillage**. When dropped in water, the tilled sample disintegrated instantly, while the regenerative soil stayed intact. Why? Because living soils produce "biotic glues" — compounds created by microbes and fungi that bind soil particles into aggregates. These sponge-like structures are essential for absorbing water and holding nutrients.

Healthy Soil Is the Foundation of a Functional Ecosystem

The real disruptor isn't carbon dioxide — it's bare soil. Archuleta challenges the idea that CO₂ emissions from human activity are the main issue. Using NASA satellite data, he shows how springtime tillage across croplands causes massive spikes in atmospheric CO₂ across North America.

But unlike industrial sources, planted fields draw that carbon back down — if they're covered with living crops. When corn and soybeans grow in early summer, they absorb large amounts of carbon through photosynthesis. The real crisis is that bare soil no longer functions as a biological pump. Without plants, it loses its ability to absorb water, store carbon, and regulate surface temperatures.

- **Water vapor, not CO₂, is the dominant factor affecting rainfall and temperature swings, and soil plays a key role in managing it —** Archuleta explains that water vapor is about 900 times more abundant than CO₂ in the atmosphere. When soil is hard, bare, or packed too tightly, it can't soak up water the way it should. That throws off the local water cycle — the natural loop where plants release moisture into the air, which then falls back down as rain.

Archuleta says around 40% of our rain actually comes from moisture released by plants, not the ocean. When land is bare, it doesn't hold water or cool the air; it reflects heat instead. That extra heat builds up and leads to more extreme weather, like droughts, heat waves, and sudden heavy rains.

- **Soil isn't just ground; it's architecture** — One of Archuleta's core teachings is that soil has a complex design, with multiple functional layers known as spheres: the surface skin (dermis), the rhizosphere (around roots), the porosphere (pore spaces), and more.

These layers coordinate the exchange of gases, water, nutrients, and microbial life. Disturb them with chemicals or tillage, and the system collapses. Nurture them with plant cover and rest, and the entire soil body becomes a functioning, self-regulating organism again.

- **Life pulls minerals from rocks, not chemicals** — In degraded soils, biology has been replaced with inputs. In nature, it's the living things in the soil — especially fungi and plant roots — that pull minerals out of rocks. They do this by releasing natural acids and enzymes and by breathing, which helps break the minerals down into a form plants can use.

Archuleta drives this home with images of trees growing out of **bare rock** faces, proving that it's not the nutrients in a bag that matter — it's the life in the soil that makes minerals bioavailable. Without biology, the soil is just dirt.

- **Land can be restored even in extreme conditions** — On a ranch in the Chihuahuan Desert, where annual rainfall averages just 10 inches and summer temperatures soar past 105 degrees F, Archuleta documented a full landscape transformation using nothing but **rotational grazing** and ecosystem mimicry.

Two cowboys moved the herd over 800 times per year, mimicking bison migration patterns. The result? Grasslands returned. Soil darkened. Rainfall increased. Even areas previously thought unchangeable began supporting vegetation again.

- **The lesson is simple: if you want to heal your land, let nature lead** — Archuleta urges farmers to stop trying to dominate nature and start asking, “What would nature do here?” He recommends following resources like the Biomimicry Institute and using simple tools — a shovel, a rainfall test, a visual assessment — to measure success. “Soil without plant and without microbial life is just geology,” he says. “It’s life that brings it out.”

How to Support Regenerative Agriculture and Healthier Soil

You don’t have to be a farmer to help heal the land. Every food choice you make either supports or undermines the health of our ecosystems. Right now, conventional agriculture is draining the life out of our soil, and the consequences show up in your food, your community, and your environment.

But **regenerative farmers** are proving that it’s possible to grow nutrient-dense food while restoring biodiversity, reducing flooding, and pulling carbon back into the soil. If you want cleaner air, cleaner water, and healthier food, it starts by shifting your support away from industrial systems and toward the farmers who are doing it right. Here’s how to be part of the solution.

1. **Buy directly from regenerative farmers whenever you can** — Seek out farmers who use cover crops, rotational grazing, composting, and no-till methods. Ask about their practices — not just whether they’re “**organic**.” Use directories like the Regenerative Farmers of America,³ attend local farmers markets, or join a regenerative community-supported agriculture (CSA) program. When you support these growers, you help fund living systems instead of synthetic ones.
2. **Choose meat and dairy from animals raised on pasture** — Livestock are not the enemy when they’re managed properly. Rotationally grazed cattle, sheep, goats, and poultry fertilize the land and restore plant diversity. Look for labels like “100% grass fed,” “pasture-raised,” or better yet, **talk directly with the farmer**. Every dollar spent on meat raised this way supports a system that heals rather than harms.

- 3. Stop supporting brands that rely on industrial agriculture** — Most processed foods, [plant-based meat substitutes](#), and industrial dairy products come from degraded land reliant on heavy chemical use. These companies contribute to runoff, erosion, and soil loss. When possible, avoid [ultraprocessed foods](#) and buy from smaller brands that disclose sourcing practices. If a brand can't tell you how its ingredients are grown, it's probably not worth supporting.
- 4. Raise awareness in your community and online** — Most people have never seen a soil profile, a rainfall simulator, or the difference between living and dead land. Share content from educators like Ray Archuleta and before-and-after case studies that show real land restoration. Invite your friends to farm tours, local talks, or online webinars. The more people see what healthy soil looks like, the faster this movement grows.
- 5. Vote with your fork and your voice** — Every purchase you make is a signal. Every conversation you start, every farmer you support, every city council comment you submit — those things matter. Advocate for policies that encourage soil regeneration, not chemical subsidies. Support local food programs in schools. Ask your grocery store to carry pasture-raised options.

You have more power than you think when you act consistently and with intention. Healing the land doesn't just belong to farmers — it belongs to anyone who eats. Your daily choices shape the system. Choose to support the ones working with nature, not against it.

FAQs About Regenerative Agriculture

Q: What is regenerative agriculture and how does it work?

A: Regenerative agriculture is a system of farming that mimics nature's patterns to restore soil health, increase biodiversity, and improve water retention. It uses practices like rotational grazing, cover cropping, and minimal soil disturbance to

build living soil biology, which creates healthier plants, sequesters carbon, and reduces the need for synthetic inputs.

Q: Why is conventional farming damaging the land?

A: Conventional agriculture relies on heavy tillage, chemical fertilizers, and monocultures. These practices destroy soil structure, kill beneficial microbes, and leave the ground bare, causing water runoff, erosion, and loss of fertility. As Archuleta explained, this has turned once-thriving land into lifeless dirt that repels rain and contributes to environmental problems.

Q: How do cows help regenerate soil instead of harming it?

A: When managed properly through rotational grazing, cows fertilize the land with manure, spread seeds, and stimulate plant growth, just like wild herds once did. Moving livestock frequently allows grasslands to rest and regrow, rebuilding soil structure and increasing water infiltration. This turns animals into tools for healing degraded ecosystems.

Q: What can I do if I'm not a farmer?

A: You can support regenerative agriculture by buying directly from farmers who use regenerative practices, choosing pasture-raised meat and dairy, avoiding processed foods grown with industrial methods, and spreading awareness. Every food choice you make helps support or dismantle the current system.

Q: How does healthy soil impact me personally?

A: Living soil produces more nutrient-dense food, holds water better during droughts, and supports cleaner air and water. It also plays a major role in supporting the environment by pulling carbon out of the atmosphere. Supporting regenerative systems means investing in your own health, your community's resilience, and the future of the planet.

Sources and References

- ^{1, 2} YouTube, Matt Powers, The Right How, Cow, Plants, and Biology Can Heal the Land With Ray Archuleta, R-SOIL 2024, January 1, 2025
- ³ Regenerative Farmers of America